

VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a **minor municipal** permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et seq. The discharge results from treatment of kitchen and sanitary waste from an elementary school and community cannery. This permit action consists of reissuance of the permit for a term of five years with limitations on pH, biochemical oxygen demand (BOD₅), total suspended solids (TSS), dissolved oxygen (DO), total kjeldahl nitrogen, E. coli and total residual chlorine (TRC). (SIC Code: 8211 - elementary and secondary schools & 4952 - sewage treatment)

1. **Facility Name and Address:**

New London Academy STP - 12400 East Lynchburg-Salem Turnpike, Forest, VA 24523
Bedford County School Board, Post Office Box 748, Bedford, VA 24523

Location: The plant is at the back of the school, on the North side of Route 460, at the intersection with Route 811, in the community of New London, Bedford County, Virginia

2. **Permit No. VA0020826**

Expiration Date: July 6, 2008

3. **Owner Contact:** Name: Mr. Dennis W. Overstreet
Title: Director of Maintenance

Telephone No.: (540)586-1045 ext. 237

Operator Contact: Name: Mr. Elmer Handy
Title: Operations Manager

Telephone No.: (540)586-7679 ext. 103

Bedford Co. Public Service Authority, 1723 Falling Creek Road, Bedford, VA 24523

4. **Application Complete Date:** January 9, 2008

Permit Drafted By: Susan K. Edwards

Date: May 20, 2008

DEQ Regional Office: West Central Regional Office

Reviewed By: [Signature]

Date: 5/27/2008

Public Comment Period Dates: June 4 through July 5, 2008

5. **Receiving Stream Name:** Buffalo Creek, unnamed tributary to (River mile: 0.67)

Basin: Roanoke River Sub-basin: Roanoke River Section: 5a

Class: III, Non-tidal Piedmont Zones Waters Special Standards: PWS

7-Day, 10-Year Low Flow (7Q10): 0.0 MGD 7Q10 High Flow months: Jan. - May

1-Day, 10-Year Low Flow (1Q10): 0.0 MGD 1Q10 High Flow months: Jan. - May

30-Day, 5-Year Low Flow (30Q5): 0.0 MGD Harmonic Mean Flow: 0.0 MGD

30-Day, 10-Year Low Flow (30Q10): 0.0 MGD

Tidal: No

303(d) Listed? No

Attachment A contains a copy of the flow frequency determination memorandum.

6. **Operator License Requirements:** Class III

7. **Reliability Class:** I

8. **Permit Characterization:**

() Private () Federal () State (X) POTW () PVOTW

() Possible Interstate Effect () Interim Limits in Other Document

9. **Wastewater Treatment System:** See **Attachment A** for treatment plant schematic and copy of the site visit report.

Discharge Description			
Outfall	Discharge Sources	Treatment	Design Flow
001	Sewage treatment plant (STP) processes domestic wastewater generated by approximately 314 students, faculty and staff at New London Academy & flows from community cannery.	Grease trap, bar screen, aeration basin reactor with Bio-Wheel contactor, clarifier, aerated sludge holding tank, dual effluent filters, tablet chlorination, chlorine contact tank, tablet dechlorination, flow monitoring, post aeration & outfall structure. Cannery influent pre-treated - pH adjustment, flow equalization & aeration.	5,500 gallons per day

10. **Sewage Sludge Use or Disposal:** The permittee contracts a local septic waste transporter for disposal of sludge from the aerated holding tank of the wastewater treatment facility, and waste from the grease trap, to the Roanoke Regional Water Pollution Control Plant.
11. **Discharge Location Description:** The treatment plant is located at the edge of the woods on the back of the school's playgrounds area behind the school. A portion of the USGS topographic map, which indicates the discharge location and other items of interest is included in **Attachment A**. There are no significant (large) dischargers to the receiving stream or water intakes within the immediate area.

Name of Topo: Forest (107D)

Discharge: N 37°18'29", E 79°18'23"

12. **Material Storage:** A covered bucket of soda ash is stored at the head of the fenced treatment works for addition as needed. Chlorination and dechlorination tablets are stored within the old chlorine building in covered buckets. No materials are stored uncovered in a location that exposes them to rainfall, which might present a risk of reaching State waters.

13. **Ambient Water Quality Information:**

The receiving stream at the point of discharge is depicted as a dry ravine on the USGS quadrangle for the area, which drains to an intermittent stream as represented by a dashed line. The DEQ Office of Water Quality Assessments and Planning prepared a Flow Frequency Determination Memorandum dated December 22, 1997. The Memorandum gave the flows for the unnamed tributary has 0.0 cfs for 1Q10, 7Q10, 30Q5, high flow 1Q10, high flow 7Q10 and the harmonic mean. The same memo gave flows for the first perennial point of the unnamed tributary. A copy of the memo is provided in **Attachment A**. No additional information was available that would cause this flow frequency to be superceded. The site visit for this reissuance confirm that it is not expected that during critical conditions there would be flow at the point of discharge.

The receiving water body is an unnamed tributary to Buffalo Creek. The receiving water body is within Section 5a of the Roanoke River of the State Water Control Board's Water Quality Standards, River Basin Section Tables (9 VAC 25-260-450). The receiving stream is Class III - Non-tidal Piedmont Zones Water with Public Water Supply special standards. The outfall is at river mile 0.67.

New London Academy STP falls into the Roanoke River basin/Big Otter River watershed (VAW-L27R). The VAW-L27R segment of Big Otter River begins at the mouth of the Little Otter River on the Big Otter River and ends at the confluence of Buffalo Creek with the Big Otter River, 5.39 miles downstream. The Buffalo Creek/Big Otter River watershed is listed on the 2006 List of Impaired (Category 5) Waters. The discharge is upstream of the segment listed as impaired in the TMDL. As an upstream sub-watershed it may be considered contributing to the impairment. The watershed is listed on the Impaired Waters List for recreational use impairment due to exceedance of the bacterial standard. The development of the TMDL was scheduled for 2018, but the discharge was added by Addendum to the TMDL for the Big Otter River. The 2006 Impaired Waters Fact Sheet for the watershed and the allocation table from the TMDL are provided in **Attachment A**.

DEQ STORET water quality data is used to characterize receiving stream conditions for use in water quality modeling and reasonable potential effluent limitations analysis of water quality parameters in the effluent. The Regional Model for Free-flowing Streams requires receiving stream temperature as a model input. The wasteload allocation spreadsheet currently in use calls for receiving stream 90% annual and wet season temperature, 90% maximum pH and 10% maximum pH as well as mean hardness.

In the 2001 permit modification and 2003 reissuance monitoring data from stations 4ABOR016.26 and 4ABNF001.06 were considered as representative of receiving water pH, temperature and hardness. Station 4ABOR016.26 is well downstream of the discharge on Big Otter River at the Route 24 Bridge. Station 4ABNF001.06 is on the North Fork of the Otter River at the Route 644 Bridge. In the previous limit evaluation Station 4ABNF001.06 was used for water quality modeling as the closest smaller waterbody monitoring station to the New London site.

There are two newer DEQ STORET monitoring stations in the watershed. The closest is 4ABWA008.53 along Route 623 near New London. It is on Buffalo Creek well downstream of the discharge, but still the closest to the discharge on the receiving stream. Unfortunately there is only a single monitoring data point available for this station collected April 2, 2003. The single event does not provide a good basis to establish permit limits. The next closest DEQ STORET water monitoring site is 4ABWA002.00 on Buffalo Creek below the Route 24 Bridge. The monitoring between July 2003 and November 2007 provides 17 data sets for pH, dissolved oxygen and temperature. Hardness data was not listed from the sampling. From the 17 data sets, the 90th percentile pH value is 7.58 and the 90th percentile is 23.2 °C.

The data from these Buffalo Creek stations was compared with that of a near-by station with a longer period of record - Elk Creek station 4ECR003.02 from August 1992 through May 2001. The station is located at the Route 688 Bridge over Elk Creek. This station's watershed adjoins that of Buffalo Creek and has similar land use and most likely similar in geology. The 90th percentile temperature was 22.6 °C and 90th percentile pH was 8.0. The mean hardness for the station over the reporting period was 29.5 mg/l CaCO₃. The STORET data from the 17 sets of newer Buffalo Creek data were used in the limit evaluation below together with hardness data from the Elk Creek STORET station, updated flow frequency data for the perennial stream, effluent pH data from DMR data and temperature data from the application.

14. **Antidegradation Review and Comments:** Tier I X Tier II X Tier III

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier I, existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier II water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier II waters is not allowed without an evaluation of the economic and social impacts. Tier III water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with Tier determination. The receiving waterbody, UT to Buffalo Creek, at the point of discharge is not included on the list of impaired waters. As an intermittent stream it is not expected that the water quality is better than the standards, thus, the unnamed tributary is determined to be a **Tier I** water. Therefore, existing uses of the water body and the water quality to protect these uses must be maintained. Water quality based permit limits are written to be better than or equal to the water quality standards.

The perennial stream segment of Buffalo Creek is not a segment of Buffalo Creek that is included on the list of impaired waters. The discharge is at the headwaters of a stream where there is no data to indicate that the existing water quality is not meeting the narrative and numeric criteria. As such Buffalo Creek is classified as a **Tier II** water, and no significant degradation of existing quality is allowed.

For purposes of aquatic life protection in Tier II waters, "significant degradation" means that no more than 25 percent of the difference between the acute and chronic aquatic criteria values and the existing quality (unused assimilative capacity) may be allocated. For purposes of human health protection, "significant degradation" means that no more than 10 percent of the difference between the human health criteria and the existing quality (unused assimilative capacity) may be allocated.

The antidegradation baseline for aquatic life and human health are calculated for each pollutant as follows:

Antidegradation baseline (aquatic life) = 0.25 (WQS – existing quality) + existing quality

Antidegradation baseline (human health) = 0.10 (WQS – existing quality) + existing quality

Where:

"WQS" = Numeric criterion listed in 9 VAC 25-260-5 et seq. for the parameter analyzed

"Existing quality" = Concentration of the parameter being analyzed in the receiving stream

These "antidegradation baselines" become the new water quality criteria in Tier II waters and effluent limits for future expansions must be written to maintain the antidegradation baselines for each pollutant. The outfall 001 discharge is existing and there is no indication of any proposed increase in the discharge of

pollutants via this outfall. As the facility is not proposing any increase in the loading of any pollutants over historical levels, permit limits are in compliance with antidegradation requirements set forth in the Water Quality Standard Regulation, 9 VAC 25-260-30. The antidegradation review and associated effluent limits analyses, below, were conducted as described in Guidance Memorandum 00-2011, dated August 24, 2000, and comply with the antidegradation policy contained in Virginia's Water Quality Standards set forth in 9 VAC 25-260-30.

15. **Site Inspection:** Date: February 5, 2008

Performed by: Susan K. Edwards

Attachment A contains a copy of the site visit memorandum.

16 **Effluent Screening and Limitation Development:** In accordance with the July 7, 2003 VPDES permit, the effluent has been monitored for compliance with flow, pH, BOD₅, TSS, TKN and chlorine limitations. Effluent limitations and monitoring requirements are based on Federal Effluent Guidelines 40 CFR 133, Virginia's water quality standards (9 VAC 25-260-5 et seq.) (specifically, DEQ Guidance Memorandum 00-2011), the previous permit, the VPDES Permit Manual and best engineering judgement. Refer to **Attachment B** for wasteload allocation (WLA) spreadsheet and effluent limit determinations.

A review of effluent data from the last three-year period as submitted on Discharge Monitoring Reports indicate that the average daily discharge is below the design/permitted flow for the plant of 5,500 gallons-per-day except for average flows reported a few times over the last year but not enough to trigger the 95% flow capacity reporting of the permit. Effluent quality has remained in compliance with most permit limits most of the time. However, there are occasionally DMR results reported in violation. Effluent data used in limit development are pH and temperature. The 90th and 10th percentile of three years of monthly maximum effluent pH data are 8.34 and 7.5 S.U. respectively. Temperature values were taken from the application for annual and winter temperatures as 22.5 and 10.5°C respectively. Effluent hardness was taken from 10 years of STORET data from an Elk Creek monitoring station at 29.5 mg/l CaCO₃. See **Attachment B** of a summary of monitoring data used in limit development.

Application Data - Effluent testing data submitted as part of the application was reviewed to determine if there is "suitable data" for analysis. Suitable data is that which is quantifiable and for which there are water quality standards in the state. The evaluation is of parameters that are not currently limited in this permit to assess the need to limit them as part of this reissuance. All application data submitted except for temperature are limited in the permit and will continue with this reissuance.

The permit limitations are based on the receiving water body flow values being zero. Therefore, all water quality standards based effluent limitations are set at the end of the discharge pipe. Tier II waterbody antidegradation wasteload allocation baselines are calculated for use if the treatment plant is expanded in the future. The existing discharge is not new or expanding at this time. Therefore, water quality based effluent limitations for the discharge were based on a non-antidegradation wasteload allocation spreadsheet.

A. **Mixing Zone** - The receiving water body is an unnamed tributary to Buffalo Creek. The receiving waters are assumed to be completely mixed because in critical conditions the effluent is the stream. The unnamed tributary becomes a perennial stream at approximately 2900 feet (0.55 miles) from the discharge. Mixing zones may be allowed in perennial waters, provided the antidegradation requirements for the waters are met. The current agency Mixing Zone Analysis program, version 2.1, has been used with the new critical flows to determine the antidegradation baselines for the perennial section. The program determines the percentage of the receiving stream flow to use in antidegradation wasteload allocation calculations. The program indicates that 100 percent of the 1Q10 and 7Q10 may be used for calculating wasteload allocations (WLAs). A copy of the output is provided in **Attachment B**.

B. **Effluent Limitations for Conventional Pollutants**

Flow - The treatment plant has a design capacity 5,500 GPD as stated in the O&M Manual, the previous permit issuance and the permittee's application. This permit does not include a flow limitation, but

requires flow to be estimated daily. STP daily flow is estimated as equal to the water use by the school and cannery as measured from the Bedford County PSA water meter.

pH - Limitations for pH are 6.0 S.U. minimum and 9.0 S.U. maximum according to the WQS 9 VAC 25-260-50 as a Class III Non-tidal Piedmont Zones Waters and Federal Effluent Guidelines' secondary treatment requirements (40 CFR 133). Monitoring is once per day that there is a discharge by grab sample at the discharge from the treatment plant.

Biological Oxygen Demand (BOD₅) and Dissolved Oxygen (DO) - The BOD₅ limits from the previous permit are continued. The Regional Water Quality Model for Free Flowing Streams, Version 4.0, was used to confirm the effects of the discharge on the dissolved oxygen levels in the receiving stream as compared with the 2001 modification of the permit. The model depicted the receiving stream as 2 segments downstream of the discharge. The segments meets the DO water quality criteria (5.0 mg/l) in 9 VAC 25-260-50 for Class III receiving waters and less than 0.2 mg/l drop in DO levels in the perennial segment. Treatment plant flow of 5,500 gpd was input together with 90% effluent temperature of 21 °C, segments lengths of 0.55 and 0.54 miles and an effluent DO of 6.0 mg/l. A daily average BOD₅ limit of 19 mg/l and 5.7 mg/l total kjeldahl nitrogen (TKN) maintains the DO standard of 5.0 mg/l in the intermittent stream during critical conditions. BOD₅ limitations are set at **19 mg/l monthly average** and **28 mg/l weekly maximum** with sampling once per month that there is a discharge. Likewise, the TKN limits are **5.7 mg/l monthly average** and **7.5 mg/l weekly maximum**. The effluent DO limit of **6.0 mg/l is a minimum** with measurements taken daily when there is a discharge. Treatment includes aeration at the end of the chlorine contact tank to oxygenate the effluent. The need for an ammonia limit is discussed further below as a toxic pollutant. Copies of the files from the desktop model are included in **Attachment B**. A loading allocation of 0.39 kg/day of BOD₅ is included in Part II of the Roanoke River Basin Water Quality Management Plan (9VAC25-720-80). In addition, the facility is to meet a minimum technology based requirement for 85% removal efficiency for BOD₅. Monitoring is at once per month by grab sample.

Total Suspended Solid (TSS) - Secondary treatment standards as mandated by the federal technology-based guidelines (40 CR Part 133.102) are applicable to the TSS limit. Effluent limits of **30 mg/l** as a **monthly average** and **45 mg/l** as a **weekly average** have been required for TSS. Monitoring of TSS is at once per month by grab sample. In addition, the facility is to meet a minimum technology based requirement for 85% removal efficiency for TSS.

Bacteria - Chlorine disinfection is used at this facility. In accordance with 9 VAC 25-260-170, all sewage discharges shall disinfect to achieve the applicable bacteria concentrations prior to discharge. The treatment plant discharge has been given an allocation in the bacterial TMDL for Big Otter River. See Attachment A for a copy of the TMDL allocation table listing the discharge. The applicable water quality standard for E. coli sampled multiple times during a month is a monthly average, calculated as a geometric mean, of 126 N/100 ml. Proper disinfection and compliance with the water quality standards will be assured with twice per discharge-month E. coli monitoring in accordance with the recommendations in the VPDES Permit Manual. Disinfection requirements (residual chlorine monitoring) are included and reported on the Discharge Monitoring Report. Final effluent TRC is discussed under the Toxics heading below.

C. Effluent Limitations for Toxic Pollutants

The Wasteload Allocation (WLA) spreadsheet from the 2004 reissuance has been reevaluated for the intermittent stream segment using receiving stream flows of zero along with temperature, pH and mean hardness values from STORET monitoring stations 4ABWA002.00 and 4AECR003.02 as discussed earlier. Plant flow was also input at 5,500 gallons-per-day. The WLA spreadsheet was used in evaluating ammonia and chlorine limits. Limit development is based on acute toxicity as the sequencing batch reactor treatment system discharges intermittently. With receiving stream flows of zero, toxicity limits must be met at the end of the discharge pipe.

Antidegradation Wasteload Allocations (AWLAs) have been recalculated for the perennial segment as needed to comply with antidegradation requirements for establishing baselines for toxic parameters should the discharge be expanded in the future. The AWLA spreadsheet used the inputs noted above for the WLA spreadsheet as receiving stream inputs.

Ammonia as Nitrogen - The need for an ammonia limit has been reevaluated in accordance with Guidance Memorandum 00-2011 and the current ammonia water quality criteria. The acute non-antidegradation WLA (5.59 mg/l) along with a default effluent data point of 9 mg/l were entered into the current STATS.exe 2.0.4 program to force an ammonia limit calculation. An ammonia-as-nitrogen toxic limit for the effluent would be 5.6 mg/l as a weekly average and a monthly average. The TKN value used in the Dissolved Oxygen model is equivalent to an ammonia-as-nitrogen level of 2.7 mg/l, assuming 3 mg/l refractory nitrogen in accordance with agency guidance #00-2011. Therefore, the TKN limit will protect the stream from ammonia toxicity and no limit is needed for ammonia.

Total Residual Chlorine (TRC) - The treatment plant uses chlorination as the disinfection method. The acute WLA for chlorine of 19 µg/l was input into the agency STATS statistical software together with one datum value of 20 µg/l (in accordance with GM #00-2011) to calculate the permit limits for TRC. The statistical program gave a less stringent weekly limit of 11.6 µg/l and the monthly is the same at previously established. Although anti-backsliding Regulations 9 VAC 25-31-220 L may allow the limit to be less stringent (by 0.3 g/l) this change is not significant in limit compliance as these values are well below the quantification level and below the detectable accuracy of common field measurement methods. TRC toxic limits for the effluent remain **maximum weekly average of 11.3 µg/l** and **monthly average of 9.4 µg/l**. Monitoring is once per discharge day by grab sample. The Special Condition for internal monitoring for disinfection is included in Part I of the permit. The allowed number of excursions within Part I.B.2. of the permit is based on the facility discharging 20 days per month.

Other Toxics - No other suitable toxics data is available. In accordance with Agency guidance as a discharge with a design capacity less than 40,000 gallons-per-day, no additional water quality standards monitoring will be required.

Table II - Basis for Effluent Limitations

PARAMETER	BASIS
Flow	NA – monitoring only
pH	1 (40 CFR 133) & 2 (9 VAC 25-260-50)
BOD ₅	1 - Secondary Treatment (40 CFR 133) & 2 - WQS by DO model analysis + Roanoke River Basin WQM Plan (9VAC25-720-80)
TSS	1 - Secondary Treatment (40 CFR 133)
Dissolved Oxygen	2 - WQS DO model analysis
Total Kjeldahl Nitrogen	2 - WQS toxic evaluation & WQS DO model analysis
TRC	2 - WQS toxic evaluation
E. coli	2 - WQS bacteria (9 VAC 25-260-170)

1. Federal Effluent guidelines – cite CFR
2. Water Quality-based Limits: - show calculations or cite WQM plan reference
3. Best Engineering Judgment: - provide narrative rationale
4. Other (e.g. wasteload allocation model): - specify & document with model output or WLA from TMDL or basin plan

17. **Basis for Sludge Use and Disposal Requirements:** A VPDES Sewage Sludge Application Form was submitted in the application package related to handling of wasted sludge from the aerated sludge holding tank. The permittee contracts a local septic waste transporter for disposal of sludge from the aerated holding tank of the wastewater treatment facility, and waste from the grease trap, to the Roanoke Regional Water

18. **Antibacksliding Statement**: All limitations are as stringent as the previous permit. Accordingly the anti-backsliding provisions of 9 VAC 25-31-220 L are satisfied
19. **Compliance Schedule**: (9 VAC 25-31-250) There are no new or lower limits included in the reissuance of the permit. Therefore, there is no compliance schedule needed.
20. **Special Conditions**: A brief rationale for each special condition contained in the permit is given below.
- a. **Additional Total Residual Chlorine (TRC) Limitations and Monitoring Requirements (Part I.B.)** - Rationale: Required by the Sewage Collection and Treatment Regulations, 9 VAC 25-790, bacteria standards; other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.
 - b. **95% Capacity Reopener (Part I.C.1.)** - Rationale: Required by 9 VAC 25-31-200 B2 for all POTW and PVOTW permits.
 - c. **CTC, CTO Requirement (Part I.C.2)** - Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790.
 - d. **O&M Manual Requirement (Part I.C.3)** - Rationale: Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790; VPDES Permit Regulation, 9 VAC 25-31-190 E. The O&M Manual will require updating at a minimum to include bacterial monitoring.
 - e. **Licensed Operator Requirement (Part I.C.4)** - Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 D and the Code of Virginia § 54.1-2300 et seq, Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.), require licensure of operators. This Special Condition requires staffing with an operator with a Class III license.
 - f. **Reliability Class (Part I.C.5.)** - Rationale: Required by Sewage Collection and Treatment Regulations, 9 VAC 25-790 for all municipal facilities. The Reliability Class has been designated as Class I in agreement with the OWE recommendation for the facility.
 - g. **Sludge Reopener (Part I.C.6.)** - Rationale: Required by VPDES Permit Regulation, 9 VAC 25-31-220 C 4 for all permits issued to treatment works treating domestic sewage.
 - h. **Total Maximum Daily Load Reopener (Part I.C.7)** - Rationale: Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.
 - i. **Compliance Reporting Under Part I A and B (Part I.C.8)** - Rationale: Authorized by VPDES Permit Regulation, 9 VAC 25-31-190 J 4 and 220 I. This condition is necessary when toxic pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.
 - j. **Sludge Use and Disposal (Part I.C.9)** - Rationale: VPDES Permit Regulations section 9 VAC 25-31-100 P: 220 B 2; and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements may be derived from the VPA Permit Regulations, 9 VAC 25-32-10 et seq.

- k. **Treatment Works Closure Plan** (Part I.C.10) - Rationale: State Water Control Law § 62.1-44.19. This condition requires the owner to submit a closure plan for review and approval if the treatment works is replaced or closed.
- l. **Conditions Applicable to All VPDES Permits** (Part II) - Rationale: VPDES Permit Regulations, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

21. **Changes to Permit:**

Table III - Changes to limits from 2003 reissuance

Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
	From	To	From	To		
BOD & TSS			kg/day	grams/day	Convert limits to whole units per GM06-2016	May 2008
E. coli	none	2/D-month	none	126 n/100 ml	TMDL bacterial allocation	May 2008

Deletions or Modifications to special conditions from the 2003 permit (Conditions referenced by numbering in 2003 permit.)

- B. Additional Total Residual Chlorine Limitations & Monitoring Requirements - replaced with updated condition in accordance with the latest revisions to the Agency's VPDES Permit Manual.
- C. Bacterial Effluent Limitations and Monitoring Requirements - removed as monitoring was completed in accordance with the condition and condition is no longer needed.
- D.1. Quantification Levels and Reporting Requirements under Part I.A and I.B - replaced with updated renamed special condition C.8 in accordance with the latest revisions to the VPDES Permit Manual.
- D.2. 95% Capacity Reopener – replaced with updated special condition C.1. in accordance with the latest revisions to the VPDES Permit Manual.
- D.3. O&M Manual Requirement - replaced with updated special conditions C.2 and 3 in accordance with the current edition of VPDES the Permit Manual. Also reflects the adoption of the SCAT regulations by DEQ.
- D.4. Licensed Operator Requirement - replaced with updated special condition C.4.
- D.5. Reliability Class - renumbered as special condition C.5.
- D.6. Sludge Reopener - renumbered as special condition C.6.
- D.7. Sludge Use and Disposal - replaced with updated special condition C.9. in accordance with the latest revisions to the Permit Manual.

Additions to the special conditions from the 2003 permit - In accordance with the current VPDES Permit Manual a TMDL Reopener special condition has been added. There are no other new special conditions added in accordance with the permit regulations, agency guidance and/or applicable portions of the VPDES Permit Manual.

22. **Variances/Alternate Limits or Conditions:** The permittee requested a waiver from application testing requirement at the time of application for effluent fecal coliform (EPA Form 2A, item A.12). The facility includes chlorine disinfection and the fecal coliform information is not needed for permit limitation development because the bacterial standard for freshwater in Virginia is E. coli. Therefore a waiver for the application item was granted.

No variances or alternatives to required permit conditions/limitations are within the permit. No variances from technology guidelines or water quality standards or from VPDES permit manual guidance are known to be used in the development of this permit.

23. **Regulation of Users:** (9 VAC 25-31-280 B 9) There are no industrial users contributing to the treatment works. The Bedford County School Board owns and operates the permitted treatment works and control the nature of sewage treated by the plant including that contributed by operations of the community cannery.

24. **Public Notice Information required by 9 VAC 25-31-280 B:**

All pertinent information is on file and may be inspected, and copied by contacting Susan Edwards at:
Virginia DEQ, West Central Regional Office, 3019 Peters Creek Road, Roanoke, VA 24019
Telephone no. (540)562-6700 or skedwards@deq.state.va.us

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

25. **Additional Comments:**

Previous Board Action - none.

Staff Comments - The discharge is not controversial. The WCRO Water Permit Support Group notes that the discharge is addressed in the Roanoke River planning document, and will be updated if required when the plan is updated.

Public Comments - No comments were received during the Public Notice.

Review of Reduced Monitoring Frequency - Guidance Memos 00-2011 and 98-2005 allows for reduced monitoring at facilities with excellent compliance histories. To qualify for consideration of reduced monitoring, the facility should not have been issued any Warning Letters, NOV's, or NULEs, or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years. There have been numerous Warning Letters written to the permittee in the last 3-year period (April 2008, Nov. 2007, March 2007, June 2006 and April, 2006). None of the Warning Letters resulted in the issuance of a NOV. However, having received the warning letters within the last three years the facility is not eligible for reduction of monitoring frequencies at this time.

26. **303(d) List:** This facility discharges to an unnamed tributary to Buffalo Creek. Roanoke River basin/Big Otter River watershed (VAW-L27R). The VAW-L27R segment of Big Otter River begins at the mouth of the Little Otter River on the Big Otter River and ends at the confluence of Buffalo Creek with the Big Otter River, 5.39 miles downstream. The Buffalo Creek/Big Otter River watershed is listed on the 2006 List of Impaired (Category 5) Waters. The discharge is upstream of the segment listed as impaired on the Fact Sheet. As an upstream sub-watershed it may be considered contributing to the impairment. The watershed is listed on the Impaired Waters List for recreational use impairment due to exceedance of the bacterial standard. The development of the TMDL was scheduled for 2018, but the discharge was added by Addendum to the TMDL for Big Otter River in January 2001. The discharge includes limits and monitoring requirements in accordance with agency guidance for maintaining bacterial water quality. The 2006 Impaired Waters Fact Sheet for the watershed and the allocation table from the TMDL that includes the discharge are provided in **Attachment A**.

**VPDES Permit VA0020826
New London Academy STP
Reissuance July 2008**

ATTACHMENT A

1. Flow Frequency Memo March 10, 2008
2. Portions of Price and Sanville USGS quadrangles
3. Site visit report of February 13, 2008 (February 5, 2008 visit)
4. Schematic of treatment plant from application
5. Excerpt for Buffalo Creek/Big Otter River from the 2006 List of Impaired (Category 5) Waters. Discharge is not on the impaired section of Buffalo Creek listed for VAW-L47R.
6. Bacterial allocation Table 6 for Buffalo Creek from Bacterial TMDL for Big Otter River Amendment (January 2001)
7. Data from STORET Station 4ABWA008.53 on Buffalo Creek along Route 623 near New London (single event pH, DO, hardness and temperature) and Station 4ABWA002.00 on Buffalo Creek along below Route 24 Bridge (17 data sets) both in Campbell County, Virginia.
8. Data from STORET Station 4AECR003.02 on Elk Creek at Route 668 Bridge, Bedford County, Virginia – August 1992 to May 2001 - pH, DO, hardness and temperature.
9. 3-year summary of effluent data from DMRs - flow, pH, BOD5, TSS, TKN & DO

MEMORANDUM
DEPARTMENT OF ENVIRONMENTAL QUALITY
Water Permitting, West Central Regional Office
3019 Peters Creek Road, Roanoke, VA 24019-2738

SUBJECT: Flow Frequency Determination - New London Academy STP, #VA0020826
TO: Permit reissuance file
FROM: Susan Edwards, WCRO
DATE: March 10, 2008

This memo supersedes the December 22, 1997, memo from Paul Herman, DEQ Office of Water Quality Assessment and Planning concerning the subject VPDES permit.

The New London Academy STP discharges to an unnamed tributary to Buffalo Creek in the Timberlake area of Bedford County, VA. Stream flow frequencies are required at the site for calculating effluent limitations for the VPDES permit.

At the discharge point, the receiving stream is shown to be a dry ditch on the USGS Forest Quadrangle topographic map. The discharge travels down the dry ditch to an intermittent stream. Flow frequencies for dry ditches and intermittent streams are 0.0 cfs for the 1Q10, 7Q10, 30Q5, 30Q10, high flow 1Q10, high flow 7Q10, and harmonic mean. The flow frequencies have been determined for the first perennial reach in unnamed tributary to Buffalo Creek.

The USGS operates a continuous record gage station on the Big Otter River near Evington, VA (#02061500) since 1937. The gage is located at the Route 682 Bridge in Campbell County, VA. The flow frequencies for the perennial point were determined by drainage areas proportions. Data for the reference gage and the perennial point are presented below:

Big Otter River near Evington, VA (#02061500): Drainage Area = 320 mi²

1Q30 = 6.5 cfs	30Q10 = 31 cfs	High Flow 1Q10 = 85 cfs
1Q10 = 18 cfs	30Q5 = 48 cfs	High Flow 7Q10 = 98 cfs
7Q10 = 21 cfs	HM = 132 cfs	High Flow 30Q10 = 131 cfs

Unnamed tributary to Buffalo Creek at perennial point: Drainage Area = 1.64 mi²

1Q30 = 0.03 cfs (0.022 mgd)	30Q10 = 0.16 cfs (0.103 mgd)	High Flow 1Q10 = 0.44 cfs (0.282 mgd)
1Q10 = 0.09 cfs (0.060 mgd)	30Q5 = 0.25 cfs (0.159 mgd)	High Flow 7Q10 = 0.50 cfs (0.325 mgd)
7Q10 = 0.11 cfs (0.070 mgd)	HM = 0.68 cfs (0.437 mgd)	High Flow 30Q10 = 0.67 cfs (0.434 mgd)

This analysis assumes there are no significant discharges, withdrawals or springs influencing the flow in the unnamed tributary to Buffalo Creek upstream of the perennial point.

The high flow months are January through May.



M E M O R A N D U M
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
WEST CENTRAL REGIONAL OFFICE
WATER DIVISION

3019 Peters Creek Road

Roanoke, Virginia 24019-2738

SUBJECT: Site visit for VPDES Permit Reissuance - VA0020826
New London Academy STP, Bedford County School Board

To: Permit files VPDES permit VA0020826

From: Susan K. Edwards, Environmental Engineer Sr.

Date: February 13, 2008

Copies: Samuel C. Hale, Compliance Supervisor

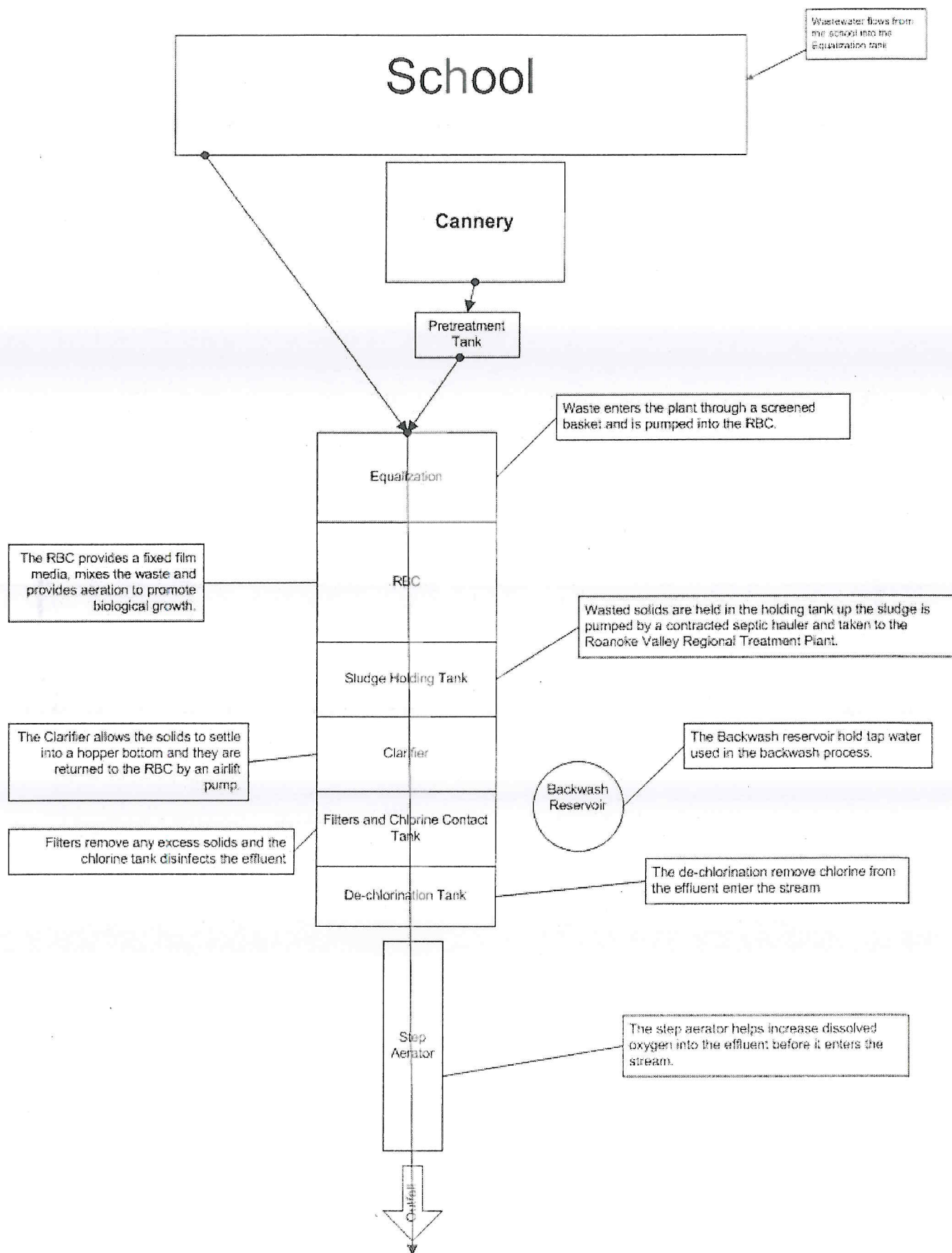
On Tuesday, February 5, 2008, the writer performed a site visit at the Body Camp Elementary School STP. Jennifer Mitchell who is a treatment plant operator with the Bedford County PSA was the facility representative during the site visit. The PSA operates the school's wastewater treatment facilities together with school janitorial staff.

The system is a 5,500 gallon-per-day biological treatment system. The treatment facility consists of a grease trap, equalization tank, sequencing batch reactor package plant, followed by a tablet chlorine feeder, chlorine contact tank, tablet dechlorination and post-aeration.

The school currently serves approximately 314 students and staff members as well as a community cannery operated seasonally. Sewage influent rates are based on daily water use measured by the water meter for the school. Unlike the other treatment plants visited this day, the New London Academy STP is a new sequencing batch reactor (SBR) package plant with tablet chlorination and dechlorination followed by cascade aeration steps. Soda ash is used for pH adjustment. The old chlorine storage building is used for a liquid pH feed and a molasses feeding system that is no longer used. Both tubes of the 2-tube chlorine feeder are currently in use. The dechlorination feeder is a 2-tube unit with both in use. The cascade aeration steps produce an even spread of flow across each step as the treated flow makes it's way to the discharge pipe. The operator indicated that effluent samples are collected at the bottom of the aeration steps rather than at the end of the discharge pipe at the receiving stream. The discharge is through a PVC pipe through the woods to an unnamed tributary to Buffalo Creek. The "receiving stream" is a well-defined channel (farm ditch) and there appeared to be flow evident without the contribution of the discharge. The effluent had no unusual appearance at the outlet. There was no build-up of biological sludge observed downstream of the discharge. There is erosion at the point of discharge. Addition of a few rocks at the base of the discharge pipe would eliminate further erosion.

Test equipment and additional chlorination and dechlorination tablets are stored on the truck used by the operator to visit each facility daily. The O&M Manual for the facility is not maintained at the plant, but is maintained at the PSA office & electronically through PSA computers. The daily operator log is stored in the old chlorine storage shed.

The facility appeared in good condition with the only areas in need attention being: the addition of a few rocks at the base of the discharge pipe





2006 Impaired Waters

Categories 4 and 5 by City / County

Roanoke and Yadkin River Basins

Fact Sheet prepared for: **Bedford Co.***

Cause Group ID: **L27R-01-BAC**

Big Otter River, Buffalo Creek and Falling Creek

2006 TMDL Group Codes: 00121 50286

Location: Big Otter River from the mouth of the Little Otter River on the Big Otter River extending downstream to the confluence of Buffalo Creek with the Big Otter River (Goode, Forest & Lynch Station Quads). Buffalo Creek mainstem from its mouth on the Big Otter River upstream to the Rt. 811 crossing. Falling Creek from its headwaters downstream to the Falling Creek mouth on the Big Otter River.

City / County: Bedford Co

Campbell Co

Use(s): Recreation

Cause(s) /

VA Category: Escherichia coli / 5A

Fecal Coliform / 4A

Fecal Coliform / 5A

The Big Otter River Bacteria Total Maximum Daily Load (TMDL) Study and allocation scenario is complete with US EPA approval on 02/02/2001 [Fed. ID 1547/9486] and SWCB approval on 6/17/2004 (former VAW-L27R-01). The waters are Category 4A for bacteria. The Bacteria Study encompasses the Little Otter drainage (L26R) including Machine Creek (L26R), Big Otter drainage (L23R, L24R, L27R, L28R) including Elk (L25R) and Sheep Creeks (L23R). Falling Creek is not specifically addressed by the Bacteria TMDL Study. However allocation scenario development is for the entire drainage to provide pollutant reductions for all watersheds contributing to the bacteria impairment. Escherichia coli (E.coli) will replace the fecal coliform bacteria 303(d) Listing as the indicator with sufficient E.coli data as per Water Quality Standards [9 VAC 25-260-170. Bacteria; other waters]. The entirety of the approved study and allocations can be viewed at <http://www.deq.virginia.gov>.

No recreational use impairments are noted in the 1998 303(d) List for the Big Otter River in watershed L27R. The 2002 5.39 mile fecal coliform portion is added to the original 1998 303(d) Listing (13.98 miles) for a total of 19.37 miles for the Big Otter River. The Big Otter impaired waters span from the mouth of Little Otter River on the Big Otter on downstream to the Big Otter River confluence with the Staunton (Roanoke) River (L28R). The 2004 IR Falling Creek addition with 5.73 miles and the 2006 IR Buffalo Creek addition of 8.10 miles brings the overall bacteria impairment in L27R to a total of 19.22 miles. The entirety of the approved study and allocations can be viewed at <http://www.deq.virginia.gov>.

Big Otter River (2002 IR):

4ABOR016.26- (Rt. 24 Bridge) There are no new data beyond the 2004 IR. The 2004 IR reports FC exceeds the 400 cfu/100 ml instantaneous criterion in three of 17 samples. The range of exceedence is from 500 cfu/100 ml to greater than 160,000.

Falling Creek (2004 IR):

4AFNG001.06- Two of two FC samples exceed the 400 cfu/100 ml instantaneous criterion at 2,400 and greater than 160,000 cfu/100 ml.

Buffalo Creek (2006 IR):

4ABWA007.87- Single observation of FC exceeds the 400 cfu/100 ml instantaneous criterion at 28,000 cfu/100 ml. The waters are impaired based on the magnitude of the FC exceedence and E.coli exceedences downstream at station 4ABWA002.00

4ABWA002.00- Five of nine E.coli observations exceed the instantaneous criterion. Values exceeding the criterion range from 250 to 600 cfu/100 ml.

Falling Creek (2004 IR):



2006 Impaired Waters

Categories 4 and 5 by City / County

Roanoke and Yadkin River Basins

Fact Sheet prepared for: Bedford Co.*

4AFNG001.06- (Rt. 714 Bridge) Two of two FC samples exceed the 400 cfu/100 ml instantaneous criterion at 2400 and greater than 160,000 cfu/100 ml.

Assessment Unit / Water Name / Description	Cause Category / Name	Cycle First Listed	TMDL Schedule	Size
VAW-L27R_BWA01A00 / Buffalo Creek Lower / Buffalo Creek mainstem from its mouth on the Big Otter River upstream to the end of the WQS designated public water supply (PWS) Sec. 5j end.	5A Escherichia coli	2006	2018	1.96
VAW-L27R_BWA02A02 / Buffalo Creek Upper / Buffalo Creek from the end of the WQS designated public water supply (PWS) section 5j upstream to an unnamed tributary at the Rt. 811 crossing in Campbell County (37° 14' 56"/79° 18' 20").	5A Escherichia coli	2006	2018	6.14

Big Otter River, Buffalo Creek and Falling Creek

Estuary (Sq. Miles) Reservoir (Acres) River (Miles)

Escherichia coli - Total Impaired Size by Water Type: 8.10

Assessment Unit / Water Name / Description	Cause Category / Name	Cycle First Listed	TMDL Schedule	Size
VAW-L27R_BOR01A00 / Big Otter River Lower / Big Otter River mainstem from the upstream WQS designated public water supply (PWS) Sec. 5j end downstream to the Buffalo Creek mouth on the Big Otter River.	4A Fecal Coliform	2002	2001	2.65
VAW-L27R_BOR02A00 / Big Otter River Upper / Big Otter River mainstem from the mouth of Little Otter R. on Big Otter R. downstream to the upstream end of the WQS designated public water supply (PWS) section 5j.	4A Fecal Coliform	2002	2001	2.74
VAW-L27R_BWA01A00 / Buffalo Creek Lower / Buffalo Creek mainstem from its mouth on the Big Otter River upstream to the end of the WQS designated public water supply (PWS) Sec. 5j end.	5A Fecal Coliform	2006	2018	1.96
VAW-L27R_BWA02A02 / Buffalo Creek Upper / Buffalo Creek from the end of the WQS designated public water supply (PWS) section 5j upstream to an unnamed tributary at the Rt. 811 crossing in Campbell County (37° 14' 56"/79° 18' 20").	5A Fecal Coliform	2006	2018	6.14
VAW-L27R_FNG01A02 / Falling Creek / Falling Creek mainstem from its mouth on the Big Otter River upstream to it headwaters.	4A Fecal Coliform	2004	2001	5.73

Big Otter River, Buffalo Creek and Falling Creek

Estuary (Sq. Miles) Reservoir (Acres) River (Miles)

Fecal Coliform - Total Impaired Size by Water Type: 19.22



2006 Impaired Waters

Categories 4 and 5 by City / County

Roanoke and Yadkin River Basins

Fact Sheet prepared for: Bedford Co.*

Sources:

Livestock (Grazing or
Feeding Operations)

On-site Treatment Systems
(Septic Systems and Similar
Decentralized Systems)

Unspecified Domestic Waste

Wildlife Other than
Waterfowl

*The narrative above describes the entire extent of the Impairment. Sizes presented may not represent the total overall size of the impairment. Impaired waters may cross or share jurisdictional boundaries and as a result are not strictly limited to a specific jurisdictional boundary.

Tables 5-8 show summaries of flow and loading information for permitted dischargers along the Machine Creek, Buffalo Creek, Flat Creek and the Lower Big Otter River impaired segments.

Table 5. The hourly and annual loads from the point sources in the Machine Creek watershed.

PS Discharge	Flow (cfs)	Load (cfu/hr)	Annual Load ¹ (cfu/yr)
VA0020818	0.0696	14,200,000	1.24×10^{11}
Total			1.24×10^{11}

¹ Annual load is hourly load times 8,760 hr/yr

Table 6. The hourly and annual loads from the point sources in the Buffalo Creek watershed.

PS Discharge	Flow (cfs)	Load (cfu/hr)	Annual Load ¹ (cfu/yr)
VA0020826	0.0062	1,270,000	1.11×10^{10}
VA0078999	0.6173	126,000,000	1.10×10^{12}
VA0089311	0.0124	N/A ²	N/A
Total			1.11×10^{12}

¹ Annual load is hourly load times 8,760 hr/yr

² Permitted to discharge pool water (pH, solids).

Table 7. The hourly and annual loads from the point sources in the Flat Creek watershed.

PS Discharge	Flow (cfs)	Load (cfu/hr)	Annual Load ¹ (cfu/yr)
VA0031194	0.3713	75,800,000	6.64×10^{11}
VA0050628	3.2492	N/A ²	N/A
Total			6.64×10^{11}

¹ Annual load is hourly load times 8,760 hr/yr

² Permitted to discharge quarry dewatering (pH, solids) only.

Table 8. The hourly and annual loads from the point sources in the Lower Big Otter watershed.

PS Discharge	Flow (cfs)	Load (cfu/hr)	Annual Load (cfu/yr)
VA0078646	0.04641	N/A ¹	N/A
Total			N/A

¹ Permit is for flow, pH and TSS only (filter backwash at WTP)

All waste load allocations (WLAs) were calculated based on each point source discharging fecal coliform at permitted limits. Future changes in the permit may require a re-examination of the TMDLs to see if there are any impacts on water quality.

STORET data
Bufalo Creek
HUC Code 3010101
VAW-L27R

4ABWA008.53 37d17'22" -79d16'23"

Along Rt. 623 near New London

<u>Collection Date</u>	<u>Field pH</u>	<u>DO Probe</u>	<u>Temp.</u> <u>Celsuis</u>	<u>Specific</u> <u>Conductance</u>	<u>Parameter Name</u>	<u>Value</u>
4/2/2003	7.22	11.64	12	110.2	TOT HARD CACO3 MG/L	38.4

4ABWA002.00 37d15' 7" -79d19'27"

Below Rt. 24 Bridge

<u>Collection Date</u>	<u>Field pH</u>	<u>DO Probe</u>	<u>Temp.</u> <u>Celsuis</u>	<u>Specific</u> <u>Conductance</u>	<u>Parameter Name</u>	<u>Value</u>
7/10/2003	7.32	8.3	22.66	98	TURBIDTY LAB NTU	21
9/24/2003	7.27	9.16	17.92	91.3	TURBIDTY LAB NTU	14
11/20/2003	6.54	10.16	11.48	82.37	TURBIDTY LAB NTU	28
1/22/2004	--	--	--	--	TURBIDTY LAB NTU	5.3
3/16/2004	6.9	10.8	10.1	79	TURBIDTY LAB NTU	6
5/25/2004	7.34	8.16	23.99	107.2	TURBIDTY LAB NTU	8.7
7/19/2004	6.97	8.11	22.2	104.1	TURBIDTY LAB NTU	5.3
9/30/2004	6.83	7.86	18.5	116	TURBIDTY LAB NTU	9.4
11/9/2004	7.41	9.8	10	89.4	TURBIDTY LAB NTU	5.8
1/11/2005	7.3	11.55	7.08	57.37	TURBIDTY LAB NTU	4.5
3/14/2005	7.5	11.2	8.55	96.3	TURBIDTY LAB NTU	6.4
5/24/2005	7.5	8.5	16.7	81.23	TURBIDTY LAB NTU	8.2
1/30/2007	8.4	12.4	2.4	102	TURBIDTY LAB NTU	4.42
3/27/2007	7.7	10.5	17	89	TURBIDTY LAB NTU	6.2
5/7/2007	7.5	11	15.7	92	TURBIDTY LAB NTU	4.7
7/17/2007	7.3	7.8	25	104	TURBIDTY LAB NTU	7.6
9/19/2007	7.5	9.4	18.3	100	TURBIDTY LAB NTU	3.9
11/13/2007	7.2	10.1	11.1	85	TURBIDTY LAB NTU	4.2
90%tile >	7.58	90%tile >	23.2			

Station_ID	4AECR003.02
Station_Description	STA #11 RT. 668 BRIDGE (BEDFORD COUNTY)
Stream_Name	ELK CREEK
Watershed_Code	VAW-L25R

Date	pH	DO	Temp C	Specific Conductnc	Total hardness CaCO3 mg/l
8/19/92	8.82	8.8	20.8	80	34
9/21/93	7.1	7.6	18.7	80	46
12/7/93	7.1	11.3	7	45	26
3/14/94	7.8	11.5	7.1	45	22
6/22/94	7.23	7.4	23.1	80	30
9/13/94	7.45	9.3	15.7	65	32
12/13/94	7.68	13.6	1.2	40	24
3/22/95	7.6	11.2	16	55	28
6/14/95	7.3	8.6	19.5	65	100
9/19/95	7.4	8.5	17.8	80	38
12/6/95	6.68	12.4	5.5	52	31
3/4/96	7.39	14	2.5	43	36
6/4/96	8	7.6	20	65	26
9/17/96	7.57	8.4	19	85	41
12/16/96	7.54	12.8	4.2	45	26.3
3/26/97	7.66	11	10.5	52	26.8
6/23/97	7.61	7.5	23.4	80	31.9
9/29/97	7.55	8.5	16.7	110	40.4
12/15/97	8.04	14.2	0.3	50	31.3
3/30/98	7.64	9.3	15.5	60	30.5
6/11/98	7.53	8.3	18.9	72	27.8
9/16/98	7.45	8.7	20	90	35.1
12/2/98	7.69	12.7	4.6	55	28
3/16/99	7.87	12.3	4.2	50	22
6/14/99	7.59	8	21.3	90	34.9
8/19/99	6.71	7.3	22.5	116.8	34.5
12/27/99	7.96	13.5	1.5	41.5	28.5
2/24/00	7.37	11.55	7	72.5	21
3/22/00	6.3	11.13	9.14	60.5	29
4/24/00	7.46	8.86	13.4	68.5	17
4/25/00	6.72	10.32	11.53	73.5	27
6/21/00	7.6	6.98	22.8	83.5	27.3
7/13/00	7.66	7.6	23.2	82	26
9/27/00	6.98	8.6	15.3	79	27.1
11/29/00	7.44	12.41	3.1	79.9	21.1
1/24/01	7.99	13.2	3	50	23.1
3/12/01	7.77	12.4	10.9	62	21.4
5/22/01	7.38	7.87	18.7	82	27.8
90th%tile >	8.0	90th%tile >	22.59		29.5 <-geo mean

DMR Data Summary
New London Academy STP

VPDES Permit VA0020826

Due Date	Flow (MGD)		pH (s.u.)		BOD5			TSS			TKN			DO	
	Qty	Avg	Max	Min	Qty	Max	Avg	Conc	Qty	Max	Avg	Conc	Avg		Max
10-Feb-2005	0.0031	0.00573	8	6.5	0.152	0.152	7	7	0.342	0.342	16	16	0.59	0.59	8.2
10-Mar-2005	0.0039	0.00685	8	6.5	0.194	0.194	11	11	0.37	0.37	21	21	2.16	2.16	9.6
10-Apr-2005	0.003	0.005	8	6.5	0.164	0.164	11	11	0.135	0.135	9	9	0.62	0.62	8.8
10-May-2005	0.0033	0.00518	8	6.5	0.12	0.12	17	17	0.035	0.035	5	5	<QL	<QL	7.7
10-Jun-2005	0.0037	0.0077	8	6.5	0.214	0.214	18	18	0.155	0.155	13	13	<QL	<QL	7.9
10-Jul-2005	0.003	0.00588	7.5	6.5	0.208	0.229	18	25	0.082	0.082	11	11	3.5	3.5	8.1
10-Aug-2005	0.0017	0.00251	7.5	7	0.162	0.188	24.5	25	0.027	0.027	5	5	3	3	8.5
10-Sep-2005	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
10-Oct-2005	0.0037	0.0063	7.5	7	0.104	0.104	8	8	0.052	0.052	4	4	<QL	<QL	7.7
10-Nov-2005	0.0037	0.00788	8	7	0.106	0.106	9	9	0.059	0.059	5	5	<QL	<QL	8
10-Dec-2005	0.0034	0.00547	8	7.5	0.24	0.24	15	15	0.064	0.064	4	4	<QL	<QL	8.1
10-Jan-2006	0.004	0.005	7.5	6.5	<QL	<QL	<QL	<QL	0.08	0.08	4.74	4.74	4.31	4.31	8
10-Feb-2006	0.0034	0.0062	8	7	0.087	0.087	7	7	0.1	0.1	8.03	8.03	4.09	4.09	8.1
10-Mar-2006	0.0029	0.00526	8	7	0.173	0.173	16	16	0.054	0.054	5	5	<QL	<QL	8.8
10-Apr-2006	0.0031	0.00409	8	7.5	0.124	0.124	8	8	0.124	0.124	8	8	<QL	<QL	9
10-May-2006	0.0036	0.00646	8	7	0.47	0.47	24	24	0.451	0.451	23	23	X	X	7.7
10-Jun-2006	0.0038	0.00558	8	7	0.115	0.115	6	6	0.172	0.172	9	9	<QL	<QL	7.3
10-Jul-2006	0.0027	0.00382	8	7	0.116	0.116	10	10	0.105	0.105	9	9	<QL	<QL	7.3
10-Aug-2006	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
10-Sep-2006	0.0039	0.0071	7.4	7.1	0.109	0.109	12	12	0.045	0.045	5	5	1.4	1.4	6.8
10-Oct-2006	0.0045	0.01193	7.6	6.8	0.279	0.279	14	14	0.16	0.16	8	8	2.63	2.63	6.3
10-Nov-2006	0.0034	0.0046	8.4	6.75	0.09	0.09	6	6	0.045	0.045	3	3	2.83	2.83	6.3
10-Dec-2006	0.0019	0.00677	8.5	6.8	0.139	0.139	12	12	0.069	0.069	6	6	1.18	1.18	8.2
10-Jan-2007	0.0054	0.0642	8	7.1	0.176	0.176	8	8	0.11	0.11	5	5	2.1	2.1	9.3
10-Feb-2007	0.003	0.01588	8.4	7.1	0.4	0.439	27	29	0.035	0.035	24	24	9.25	12.2	7
10-Mar-2007	0.0052	0.01739	8.5	7	0.44	0.44	17	17	0.47	0.47	18	18	4.6	8.37	7.4
10-Apr-2007	0.0038	0.1056	7.8	6.6	0.106	0.106	8	8	0.211	0.211	16	16	2.1	2.1	6.4
10-May-2007	0.0029	0.0079	7.9	6.9	0.135	0.135	15	15	0.152	0.152	17	17	4.48	5.63	7.2
10-Jun-2007	0.0047	0.0098	8	6.8	0.283	0.404	18	30	0.027	0.027	2	2	2.4	5.5	7.1
10-Jul-2007	0.0062	0.01009	7.4	7	0.115	0.115	6	6	0.077	0.077	4	4	<QL	<QL	6
10-Aug-2007	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
10-Sep-2007	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL
10-Oct-2007	0.0042	0.026	7.1	6.5	0.158	0.158	13	13	0.231	0.231	19	19	5.5	13.4	6.9
10-Nov-2007	0.0044	0.008	7.9	7	<QL	<QL	<QL	<QL	0.047	0.047	2	2	<QL	<QL	7.2
10-Dec-2007	0.0042	0.0072	8	7.1	<QL	<QL	<QL	<QL	0.053	0.053	7	7	1.9	1.9	8.5
10-Jan-2008	0.0039	0.0063	8.1	6.2	0.136	0.136	16	16	0.053	0.053	11	30	3	6.8	7.2
10-Feb-2008	0.0063	0.0142	7.9	6.5	<QL	<QL	<QL	<QL	0.068	0.068	9	9	1.4	1.4	10
Permit limits	0.0055	NL	9.0	6.0	0.39	0.58	19	28	0.62	0.93	30	45	5.0	7.5	6.0

**VPDES Permit VA0020826
New London Academy STP
Reissuance July 2008**

ATTACHMENT B

1. Mixing software output file
2. BOD₅ Allocation excerpt from Roanoke River Basin Water Quality Management Plan (9VAC25-720-80)
3. Model input and output file of Regional Modeling System Version 4.0 confirming limits
4. Non-antidegradation WLA spreadsheet for ammonia and TRC limit evaluation.
5. Agency STATS software output for analysis of TRC and ammonia.
6. Antidegradation WLA spreadsheet for future expansion

Mixing Zone Predictions for: New London Academy STP

Effluent Flow = 0.0055 MGD
Stream 7Q10 = 0.070 MGD
Stream 30Q10 = 0.103 MGD
Stream 1Q10 = 0.060 MGD
Stream slope = 0.075 ft/ft
Stream width = 5 ft
Bottom scale = 2
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .0398 ft
Length = 477.41 ft
Velocity = .588 ft/sec
Residence Time = .0094 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .0495 ft
Length = 396.83 ft
Velocity = .6787 ft/sec
Residence Time = .0068 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .0365 ft
Length = 513.07 ft
Velocity = .5557 ft/sec
Residence Time = .2565 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

		Facility STP						
VAW-L25R	VA0020851	Bedford County School Board - Otter River Elementary School	001	Big Otter River, UT	1.15	BOD ₅	0.4	KG/D
VAW-L26R	VA0022390	Bedford City - Sewage Treatment Plant	001	Little Otter River	14.36	BOD ₅	52.8	KG/D
VAW-L26R	VA0020818	Bedford County School Board - Body Camp Elementary	001	Wells Creek, UT	2.22	BOD ₅	0.4	KG/D
VAW-L27R	VA0020826	Bedford County School Board - New London Academy	001	Buffalo Creek, UT	0.67	BOD ₅	0.39	KG/D
VAC-L29R	VA0031194	Briarwood Village Mobile Home Park STP	001	Smith Branch, UT	2.82	BOD ₅	1.3	KG/D
VAC-L35R	VA0023965	Campbell Co Util & Serv Auth. - Rustburg	001	Mollys Creek	17.81	BOD ₅	8.13	KG/D
VAC-L39R	VA0084433	Drakes Branch WWTP	001	Twitty's Creek	6.04	BOD ₅	6.4	KG/D
VAC-L39R	VA0024058	Keysville WWTP	001	Ash Camp Creek	7.63	CBOD ₅ , MAY-NOV TKN, MAY-NOV	32.1 7.57	KG/D KG/D
AC-L39R	VA0050822	Westpoint Stevens Inc Drakes Branch	001	Twittys Creek	7.22	BOD ₅	6.31	KG/D
VAW-L43R	VA0022985	Stuart Town - Sewage Treatment Plant	001	South Mayo River	30.78	BOD ₅	63.5	KG/D
VAW-L54R	VA0069345	Henry Co Public Service Auth. - Lower Smith River STP	001	Smith River	19.4	BOD ₅	257	KG/D
VAW-L54R	VA0025305	Martinsville City Sewage Treatment	001	Smith River	22.69	BOD ₅	681	KG/D

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to UNNAMED TRIBUTARY TO BUFFALO CREEK.**

File Information

File Name: C:\Documents and Settings\skedwards\My Documents\Working files\VPDE
Date Modified: April 02, 2008

Water Quality Standards Information

Stream Name: UNNAMED TRIBUTARY TO BUFFALO CREEK
River Basin: Roanoke River Basin
Section: 5a
Class: III - Nontidal Waters (Coastal and Piedmont)
Special Standards: none

Background Flow Information

Gauge Used: Buffalo Creek @ perennial point
Gauge Drainage Area: 1.64 Sq.Mi.
Gauge 7Q10 Flow: 0.07 MGD
Headwater Drainage Area: 0.07 Sq.Mi.
Headwater 7Q10 Flow: 2.987805E-03 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 4.268293E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 21 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.797705 mg/l

Model Segmentation

Number of Segments: 2
Model Start Elevation: 850 ft above MSL
Model End Elevation: 768 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to UNNAMED TRIBUTARY TO BUFFALO CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	NEW LONDON ACADEMY STP
VPDES Permit No.:	

Discharger Flow Information

Flow:	0.0055 MGD
cBOD5:	19 mg/l
TKN:	5.7 mg/l
D.O.:	6 mg/l
Temperature:	21 Degrees C

Geographic Information

Segment Length:	0.55 miles
Upstream Drainage Area:	0.07 Sq.Mi.
Downstream Drainage Area:	1.64 Sq.Mi.
Upstream Elevation:	850 Ft.
Downstream Elevation:	784 Ft.

Hydraulic Information

Segment Width:	0.7 Ft.
Segment Depth:	0.06 Ft.
Segment Velocity:	0.312 Ft./Sec.
Segment Flow:	0.008 MGD
Incremental Flow:	0.067 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Wide Shallow Arc
Character:	Moderately Meandering
Pool and Riffle:	No
Bottom Type:	Gravel
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to UNNAMED TRIBUTARY TO BUFFALO CREEK.

Segment Information for Segment 2

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	TRIBUTARY OF BUFFALO CREEK

Tributary Flow Information

Flow:	0.07 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	7.816 mg/l
Temperature:	21 Degrees C

Geographic Information

Segment Length:	0.54 miles
Upstream Drainage Area:	1.64 Sq.Mi.
Downstream Drainage Area:	2.3 Sq.Mi.
Upstream Elevation:	784 Ft.
Downstream Elevation:	768 Ft.

Hydraulic Information

Segment Width:	7 Ft.
Segment Depth:	0.126 Ft.
Segment Velocity:	0.249 Ft./Sec.
Segment Flow:	0.078 MGD
Incremental Flow:	0.028 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Small Rock
Sludge:	None
Plants:	None
Algae:	None

Model is for Unnamed Tributary to Buffalo Creek

Model starts at the New London Academy STP discharge

Background Data

7Q10	cBOD5	TKN	DO	Temp
(mgd)	(mg/l)	(mg/l)	(mg/l)	deg C
.003	2	0	7.798	21

Discharge/Tributary Input Data for Segment 1

Flow	cBOD5	TKN	DO	Temp
(mgd)	(mg/l)	(mg/l)	(mg/l)	deg C
.0055,	19,	5.7,	,6,	21

Hydraulic Information for Segment 1

Length	Width	Depth	Velocity
(mi)	(ft)	(ft)	(ft/sec)
.55	.7	.06	.312

Initial Mix Values for Segment 1"

Flow	DO	cBOD	nBOD	DOSat	Temp
(mgd)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	deg C
.0085	6.633	32.54	7.576	8.674	21

Rate Constants for Segment 1. - (All units Per Day)

k1	k1@T	k2	k2@T	kn	kn@T	BD	BD@T
1.4	1.466	20	20.48	.45	.486	0	0

Output for Segment 1

Segment starts at NEW LONDON ACADEMY STP

Total	Segm.			
Dist.	Dist.	DO	cBOD	nBOD
(mi)	(mi)	(mg/l)	(mg/l)	(mg/l)
0	0	6.633	32.54	7.576
.1	.1	6.491	31.619	7.504
.2	.2	6.417	30.724	7.433
.3	.3	6.389	29.854	7.363
.4	.4	6.391	29.009	7.293
.5	.5	6.413	28.188	7.224
.55	.55	6.429	27.786	7.19

Discharge/Tributary Input Data for Segment 2

Flow	cBOD5	TKN	DO	Temp
(mgd)	(mg/l)	(mg/l)	(mg/l)	deg C
.07	2	0	,7.816	21

Incremental Flow Input Data for Segment 2"

Flow	cBOD5	TKN	DO	Temp
(mgd)	(mg/l)	(mg/l)	(mg/l)	deg C
.067	2	0	7.819	21

Hydraulic Information for Segment 2

Length (mi)	Width (ft)	Depth (ft)	Velocity (ft/sec)
.54	7	.126	.249

Initial Mix Values for Segment 2

Flow (mgd)	DO (mg/l)	cBOD (mg/l)	nBOD (mg/l)	DOSat (mg/l)	Temp deg C
.1455	7.736	6.329	.419	8.687	21

Rate Constants for Segment 2. - (All units Per Day)

k1	k1@T	k2	k2@T	kn	kn@T	BD	BD@T
1	1.047	17.778	18.204	.45	.486	0	0

Output for Segment 2

Segment starts at TRIBUTARY OF BUFFALO CREEK

Total Dist. (mi)	Segm. Dist. (mi)	DO (mg/l)	cBOD (mg/l)	nBOD (mg/l)
.55	0	7.736	6.329	.419
.65	.1	7.819	6.168	.414
.75	.2	7.819	6.012	.409
.85	.3	7.819	5.859	.404
.95	.4	7.819	5.71	.399
1.05	.5	7.819	5.565	.394
1.09	.54	7.819	5.508	.392

END OF FILE

"Model Run For C:\Documents and Settings\skedwards\My Documents\Working files\VPDES\New London Acad STP\2008
reissuance\1st draft model input.mod On 4/2/2008 "

WLA Analysis For: New London Academy			Intermittent segment		Date: 05/15/08			
Stream: U1 Buffalo Crk			Effluent Information		Hardness		Mix Hardness	
Mean Hardness =	29.5	mg/L	Mean Hardness =	29.5	mg/L	acute: 29.5	acute: 29.5	29.5
Stream NH3 =	0	mg/L	Effluent NH3 =	0	mg/L	chronic: 29.5	chronic: 29.5	29.5
90% Temperature =	22.6	C	90% Temperature =	22.6	C	7Q10 Ratio: 1	* WLAa	0.99
90% pH =	9	SU	90% pH =	8	SU	1Q10 Ratio: 1	Coefficient =	1
Fractional 7Q10 =	0	MGD (100%)	Original Flow =	0.0055	MGD	Harmonic ratio: 1	Acute IWC =	1
Fractional 1Q10 =	0	MGD (100%)				30Q5 ratio: 1	chronic IWC =	1
Harmonic mean =	0	Carcinogen				Annual Average ratio: 1		
30Q5 Flow =	0	Non-carcinogen						
Annual Average =	0	Dioxin only						
R(iver),L(ake) or S(torm):	R	R, L, S						
Trout Present?	N	Y, N						
Public Water Supply:	N	Y, N						
			Aquatic Protection		Human Health Criteria			
			Freshwater Criteria		PWS		Other Waters	
			Acute	Chronic	Criteria	Criteria	Acute	Chronic
Parameter and Form	Carcinogen?	Sort? (Y/N)	Criteria	Criteria	Criteria	Criteria	WLA	WLA
1,1-dichloroethylene		n	None	None	310	17000	NA	NA
1,2,4-trichlorobenzene		n	None	None	260	950	NA	NA
1,2-dichlorobenzene		n	None	None	2700	17000	NA	NA
1,2-dichloroethane	C	n	None	None	3.8	990	NA	NA
1,3-dichlorobenzene		n	None	None	400	2600	NA	NA
1,4-dichlorobenzene		n	None	None	400	2600	NA	NA
2,4,6-Trichlorophenol	C	n	None	None	21	65	NA	NA
2,4-dichlorophenol		n	None	None	93	790	NA	NA
2,4-dichlorophenoxy acetic acid		n	None	None	71	None	NA	NA
2,4-dimethylphenol		n	None	None	540	2300	NA	NA
2,4-dinitrotoluene	C	n	None	None	1.1	91	NA	NA
2-Chlorophenol		n	None	None	120	400	NA	NA
Acenaphthene		n	None	None	1200	2700	NA	NA
Aldrin	C	n	3	0.3	0.0013	0.0014	3.00	0.30
Ammonia (mg/l as N)		n	5.592	1.274	None	None	5.59	1.27
Anthracene		n	None	None	9600	110000	NA	NA
Antimony		n	None	None	14	4300	NA	NA
Arsenic		n	None	None	50	None	NA	NA
Arsenic-3		n	360	190	None	None	360.00	190.00
Barium		n	None	None	2000	None	NA	NA
Benzene	C	n	None	None	12	710	NA	NA
Benzo(a)anthracene	C	n	None	None	0.044	0.49	NA	NA
Benzo(a)pyrene	C	n	None	None	0.044	0.49	NA	NA
Benzo(b)fluoranthene	C	n	None	None	0.044	0.49	NA	NA
Benzo(k)fluoranthene	C	n	None	None	0.044	0.49	NA	NA
Bromofom	C	n	None	None	44	3600	NA	NA
Butyl benzyl phthalate		n	None	None	3000	5200	NA	NA
Cadmium		n	0.99	0.43	None	None	0.99	0.43
Carbon Tetrachloride	C	n	None	None	2.5	45	NA	NA
Chlordane	C	n	2.4	0.0043	0.0058	0.0059	2.40	0.00
Chloride		n	860000	230000	250000	None	860000	230000
Chlorine		n	19	11	None	None	19.00	11.00
Chlorodibromomethane		n	None	None	690	57000	NA	NA
Chloroform	C	n	None	None	57	4700	NA	NA
Chlorpyrifos		n	0.083	0.041	None	None	0.08	0.04
Chrysene	C	n	None	None	0.044	0.49	NA	NA
Copper		n	5.61	4.17	1300	None	5.61	4.17
Cr III		n	638.94	76.16	None	None	638.94	76.16
Cr-hex		n	16	11	None	None	16.00	11.00
Cyanide		n	22	5.2	700	215000	22.00	5.20
DDD	C	n	None	None	0.0083	0.0084	NA	NA
DDE	C	n	None	None	0.0059	0.0059	NA	NA
DDT	C	n	1.1	0.001	0.0059	0.0059	1.10	0.00
Demeton		n	None	None	0.1	None	NA	NA
Di-2-ethylhexyl Phthalate	C	n	None	None	18	59	NA	NA
Dibenz(a,h)anthracene	C	n	None	None	0.044	0.49	NA	NA
Dibutyl phthalate		n	None	None	2700	12000	NA	NA
Dichlorobromomethane	C	n	None	None	5.6	460	NA	NA
Dichloromethane	C	n	None	None	47	16000	NA	NA
Dieldrin		n	2.5	0.0019	0.0014	0.0014	2.50	0.00190
Diethyl phthalate		n	None	None	23000	120000	NA	NA
Dioxin		n	None	None	0.0000012	0.0000012	NA	NA
Dissolved Oxygen		n	4	None	None	None	4.00	5.00
Endosulfan		n	0.22	0.056	110	240	0.22	0.06
Endrin		n	0.18	0.0023	0.76	0.81	0.18	0.00
Ethylbenzene		n	None	None	3100	29000	NA	NA
Fluoranthene		n	None	None	300	370	NA	NA
Fluorene		n	None	None	1300	14000	NA	NA
Foaming Agents (MBAS)		n	None	None	500	None	NA	NA
Guthion		n	None	0.01	None	None	NA	0.01
Heptachlor	C	n	0.52	0.0038	0.0021	0.0021	0.52	0.00
Hydrogen Sulfide		n	None	2	None	None	NA	2.00
Indeno(1,2,3-cd)pyrene	C	n	None	None	0.044	0.49	NA	NA
Iron		n	None	None	300	None	NA	NA
Isophorone		n	None	None	6900	490000	NA	NA
Kepon		n	None	None	None	None	NA	NA
Lead		n	25.14	2.86	15	None	25.14	2.86
Lindane		n	2	0.08	7	25	2.00	0.08
Malathion		n	None	0.1	None	None	NA	0.10
Manganese		n	None	None	50	None	NA	NA
Mercury		n	2.4	0.012	0.052	0.053	2.40	0.01
Methoxychlor		n	None	0.03	40	None	NA	0.03
Mirex		n	None	None	None	None	NA	NA
Monochlorobenzene		n	None	None	680	21000	NA	NA
Naphthalene (?)		n	None	None	None	None	NA	NA
Nickel		n	65.05	7.24	610	4600	65.05	7.24
Nitrate(as N)		n	None	None	10000	None	NA	NA
Nitrobenzene		n	None	None	17	1900	NA	NA
Parathion		n	0.065	0.013	None	None	0.07	0.01
PCBs(7 species)	C	n	None	None	0.00044	0.00045	NA	NA
Pentachlorophenol		n	0.06	0.04	2.8	8.2	0.06	0.04
pH		n	None	None	None	None	NA	NA
Phenol		n	None	None	21000	4600000	NA	NA
Phosphorus(elemental)		n	None	None	None	None	NA	NA
Pyrene		n	None	None	960	11000	NA	NA
Radioactivity		n	None	None	None	None	NA	NA
Selenium		n	20	5	170	11000	20.00	5.00
Silver		n	0.50	None	None	None	0.50	NA
Silvex		n	None	None	50	None	NA	NA
Sulfate		n	None	None	250000	None	NA	NA
Temperature		n	32	32	None	None	32.00	32.00
Tetrachloroethylene		n	None	None	320	3500	NA	NA
Toluene		n	None	None	6800	200000	NA	NA
Total dissolved solids		n	None	None	500000	None	NA	NA
Toxaphene	C	n	0.73	0.0002	0.0073	0.0075	0.73	0.0002

WLA Analysis For: New London Academy			intermittent segment		Date: 05/15/03	
Stream: DT Buffalo Crk			Effluent Information		Hardness	
Mean Hardness =	29.5	mg/L	Mean Hardness =	29.5	mg/L	Mix Hardness
Stream NH3 =	0	mg/L	Effluent NH3 =	0	mg/L	acute: 29.5
90% Temperature =	22.6	C	90% Temperature =	22.6	C	chronic: 29.5
90% pH =	8	SU	90% pH =	8	SU	* WLAa
Fractional 7Q10 =	0	MGD (100%)	Original Flow =	0.0055	MGD	7Q10 Ratio: 1
Fractional 1Q10 =	0	MGD (100%)				1Q10 Ratio: 1
Harmonic mean =	0	Carcinogen				Coefficient =
30Q5 Flow =	0	Non-carcinogen				0.99
Annual Average =	0	Dioxin only				Acute IWC =
R(iver),L(ake) or S(torm):	R	R, L, S				1
Trout Present?	N	Y, N				ironic IWC =
Public Water Supply:	N	Y, N				1
			Aquatic Protection			
			Freshwater Criteria			
					Human Health Criteria	
			Acute	Chronic	PWS	Other Waters
Parameter and Form	Carcinogen?	Sort? (Y/N)	Criteria	Criteria	Criteria	Criteria
Tributyltin		n	0.46	0.026	None	None
Trichloroethylene	C	n	None	None	27	810
Vinyl Chloride		n	None	None	20	5300.0
Xylenes, total		n	None	None	None	None
Zinc		n	41.60	37.67	5000	None
						Acute WLA
						Chronic WLA
						PWS WLA
						Other Waters WLA

Footnotes:

- All concentrations expressed as micrograms per liter (µg/L), except Ammonia.
- Ammonia (as mg/L) selected from separate tables, based on pH and temperature.
- Acute-1 hour avg. concentration not to be exceeded more than 1/3 years.
- Chronic-4 day avg. concentration not to be exceeded more than 1/3 years.
- Complete mix-mass balances employ 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens.
- All flow values are expressed as Million Gallons per Day.
- Metals measured as Dissolved, unless specified otherwise.
- (c)-indicates carcinogenic parameter.
- Public Water Supply-protects for fish and water consumption.
- Other Waters-protects for fish consumption only.
- Hardness expressed as CaCO3 (mg/L).
- All limitations are based on EPA's TSD Statistical approach.

5/15/2008 3:02:00 PM

Facility = New London Academy STP

Chemical = ammonia

Chronic averaging period = 30

WLAa = 5.592

WLAc = 5.592

Q.L. = 1

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average = 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 5.592

Average Weekly limit = 5.592

Average Monthly Limit = 5.592

The data are:

5/15/2008 3:38:18 PM

Facility = New London Academy STP

Chemical = Chlorine

Chronic averaging period = 4

WLAa = 19

WLAc =

Q.L. = 1

samples/mo. = 29

samples/wk. = 7

Summary of Statistics:

observations = 1

Expected Value = 20

Variance = 144

C.V. = 0.6

97th percentile daily values = 48.6683

97th percentile 4 day average = 33.2758

97th percentile 30 day average = 24.1210

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 19

Average Weekly limit = 11.6034369282885

Average Monthly Limit = 9.44430586795086

The data are:

WLA Analysis For: New London Academy

ANTIDEGRADATION Date: 5/15/2008

Stream: UT Buffalo Creek

Stream: UT Buffalo Creek										Effluent Information			Hardness:			29.50 acute			29.50 chronic			Mix Hardness=													
Mean Hardness = 29.5 mg/L			Stream NH3 = 0 mg/L			90% Temperature = 22.6 C			90% pH = 8 SU			Original Flow = 0.004 MGD			Upgrade Flow = 0.0055 MGD			7Q10 Ratio: 13.73			1Q10 Ratio: 11.91			* WLAA			Coefficient = 0.16794			Acute IWC = 0.08397			Chronic IWC = 0.07285		
Fractional 7Q10 = 0.07			Fractional 1Q10 = 0.06			Harmonic mean = 0.437			30Q5 Flow = 0.150			Annual Average = 1			R (River),(lake) or (Storm): R			Trout Present? N			Public Water Supply: Y														
Receiving Stream Concentration			Expected Effluent Concentration			Carcinogen?			Sort? (Y/N)			Aquatic Protection Freshwater Criteria			Human Health			Human Health Baseline			Acute A WLA			Chronic A WLA			Human Health A WLA								
Parameter and Form												Acute Quality Criteria at 1Q10			Chronic Quality Criteria at 7Q10			PWS Quality Criteria			Existing HH Quality			Acute Baseline			Chronic Baseline			Human Health A WLA					
1,1-dichloroethylene													None	NA	None	NA	310	0	NA	NA	31	NA	NA	NA	927										
1,2,4-trichlorobenzene													None	NA	None	NA	260	0	NA	NA	26	NA	NA	NA	778										
1,2-dichlorobenzene													None	NA	None	NA	2700	0	NA	NA	270	NA	NA	NA	8075										
1,2-dichloroethane													None	NA	None	NA	3.8	0	NA	NA	0.380	NA	NA	NA	30.57										
1,3-dichlorobenzene													None	NA	None	NA	400	0	NA	NA	40.0	NA	NA	NA	1196										
1,4-dichlorobenzene													None	NA	None	NA	400	0	NA	NA	40.0	NA	NA	NA	1196										
2,4,6-Trichlorophenol													None	NA	None	NA	21	0	NA	NA	2.1	NA	NA	NA	168.95										
2,4-dichlorophenol													None	NA	None	NA	93	0	NA	NA	9.3	NA	NA	NA	278.15										
2,4-dichlorophenoxy acetic acid													None	NA	None	NA	71	0	NA	NA	7.1	NA	NA	NA	212.35										
2,4-dimethylphenol													None	NA	None	NA	540	0	NA	NA	54.0	NA	NA	NA	1615										
2,4-dinitrotoluene													None	NA	None	NA	1.1	0	NA	NA	0.110	NA	NA	NA	8.85										
2-Chlorophenol													None	NA	None	NA	120	0	NA	NA	12	NA	NA	NA	359										
Acenaphthene													None	NA	None	NA	1200	0	NA	NA	120	NA	NA	NA	3589										
Aldrin													0.3	0	0.0013	0	0.0013	0	0.750	0.0750	0.00013	8.93	1.03	0.01	NA										
Ammonia (mg/l as N)													5.592	0	1.274	0	None	NA	1.398	0.32	NA	16.65	4.37	NA	NA										
Anthracene													None	NA	None	NA	9600	0	NA	NA	960	NA	NA	NA	28773										
Antimony													None	NA	None	NA	14	0	NA	NA	1.4	NA	NA	NA	41.87										
Arsenic													None	NA	None	NA	50	0	NA	NA	5.0	NA	NA	NA	150										
Arsenic-3													360	0	190	0	None	NA	90	47.5	NA	1071.82	652.05	NA	NA										
Barium													None	NA	None	NA	2000	0	NA	NA	200	NA	NA	NA	5982										
Benzene													530	0	53	0	12	0	132.5	13.3	1200	1577.95	181.89	97	NA										
Benzo(a)anthracene													None	NA	None	NA	0.044	0	NA	NA	0.004	NA	NA	NA	0.35										
Benzo(a)pyrene													None	NA	None	NA	0.044	0	NA	NA	0.004	NA	NA	NA	0.35										
Benzo(b)fluoranthene													None	NA	None	NA	0.044	0	NA	NA	0.004	NA	NA	NA	0.35										
Benzo(k)fluoranthene													None	NA	None	NA	0.044	0	NA	NA	0.004	NA	NA	NA	0.35										
Bromoforn													None	NA	None	NA	44	0	NA	NA	0.004	NA	NA	NA	0.35										
Butyl benzyl phthalate													None	NA	None	NA	3000	0	NA	NA	300	NA	NA	NA	8973										
Cadmium													0.99	0	0.43	0	None	NA	0.247	0.1087	NA	2.96	1.49	NA	NA										
Carbon Tetrachloride													None	NA	None	NA	2.5	0	NA	NA	0.250	NA	NA	NA	20.11										
Chlordane													2.4	0	0.0043	0	0.0058	0	0.8	0.0011	0.001	7.15	0.01	0.05											
Chloride													860000	0	230000	0	250000	0	215,000	57500	25000	2560455	789318	747727											
Chlorine													19	0	11	0	None	NA	4750	27500	NA	37.75	37.75	NA	2064										
Chlorobromomethane													None	NA	None	NA	690	0	NA	NA	69.0	NA	NA	NA	458.59										
Chloroform													None	NA	None	NA	57	0	NA	NA	5.7	NA	NA	NA	NA										
Chlorpyrifos													0.083	0	0.041	0	None	NA	0.021	0.0103	NA	0.25	0.14	NA	NA										
Chrysene													None	NA	None	NA	0.044	0	NA	NA	0.004	NA	NA	NA	0.35										
Copper													5.61	0	4.17	0	1300	0	1403	1.0415	130.0	16.71	14.30	3888.18											
Cr III													638.94	0	76.16	0	None	NA	159.7	19.04	NA	1902.31	261.36	NA	NA										
Cr-hex													16	0	11	0	None	NA	4.0	2.75	NA	47.64	37.75	NA	NA										
Cyanide													22	0	5.2	0	700	0	5.5	1.3	70	65.50	17.85	2094											
DDD													None	NA	None	NA	0.0083	0	NA	NA	0.001	NA	NA	NA	0.07										
DDE													None	NA	None	NA	0.0059	0	0.275	0.0003	0.0006	NA	NA	0.05	0.05										
DDT													1.1	0	0.001	0	0.0059	0	0.275	0.0003	0.0006	3.28	0.00	0.05	0.05										
Demeton													None	NA	0.1	0	None	NA	NA	0.0250	NA	NA	NA	0.34	NA	NA									
Di-2-ethylhexyl Phthalate													None	NA	None	NA	18	0	NA	NA	1.8	NA	NA	NA	144.82										
Dibenz(a,h)anthracene													None	NA	None	NA	0.044	0	NA	NA	0.0044	NA	NA	NA	0.35										
Dibutyl phthalate													None	NA	None	NA	2700	0	NA	NA	270	NA	NA	NA	8075										
Dichlorobromomethane													None	NA	None	NA	5.6	0	NA	NA	0.560	NA	NA	NA	45.1										
Dichloromethane													None	NA	None	NA	47	0	NA	NA	0.560	NA	NA	NA	378.14										
Dieldrin													2.5	0	0.0019	0	0.0014	0	0.825	0.0005	0.0001	7.44	0.01	0.0004	NA										
Diethyl phthalate													None	NA	None	NA	23000	0	NA	NA	2300	NA	NA	NA	68791										
Dioxin													None	NA	None	NA	0.0000012	0	NA	NA	0.000	NA	NA	NA	0.00002194										
Dissolved Oxygen													4	0	5	0	None	NA	1.000	1.2500	NA	11.91	17.16	NA	NA										
Endosulfan													0.22	0	0.056	0	110	0	0.055	0.0140	11.0	0.86	0.19	329.00											

Endrin	0.18	0	0.0023	0	0.76	0	0.045	0.0006	0.076	0.54	0.01	2.27
Ethylbenzene	3200	0	320	0	3100	0	800	80	310	9.527	1,098	9272
Fluoranthene	None	NA	None	NA	300	0	NA	NA	30	NA	NA	897
Fluorene	None	NA	None	NA	1300	0	NA	NA	130	NA	NA	3888
Foaming Agents (MBAS)	None	NA	None	NA	500	0	NA	NA	50	NA	NA	1495
Guthion	None	NA	0.01	0	None	NA	NA	0.0025	NA	NA	0.03	NA
Heptachlor	0.52	0	0.0038	0	0.0021	0	0.130	0.0010	0.0002	1.55	0.01	0.02
Hydrogen Sulfide	None	NA	2	0	None	NA	NA	0.5	NA	NA	6.86	NA
Indeno(1,2,3-cd)pyrene	None	NA	None	NA	0.044	0	NA	NA	0.004	NA	NA	0.35
Iron	None	NA	None	NA	300	0	NA	NA	30.0	NA	897.27	NA
Isophorone	None	NA	None	NA	6900	0	NA	NA	690	NA	NA	20637
Kepone	None	NA	None	NA	None	NA	NA	NA	NA	NA	NA	NA
Lead	25.14	0	2.86	0	15	0	6.284	0.7139	1.500	74.84	9.80	44.86
Lindane	2	0	0.08	0	7	0	0.5	0.02	0.70	5.95	0.27	20.94
Malathion	None	NA	0.1	0	None	NA	NA	0.0250	NA	NA	0.34	NA
Manganese	None	NA	None	NA	50	0	NA	NA	5.0	NA	NA	149.55
Mercury	2.4	0	0.012	0	0.052	0	0.6	0.0030	0.005	7.15	0.04	0.16
Methoxychlor	None	NA	0.03	0	40	0	NA	0.0075	4.0	NA	0.10	120
Mirex	None	NA	None	NA	None	NA	NA	NA	NA	NA	NA	NA
Monochlorobenzene	None	NA	None	NA	680	0	NA	NA	68	NA	NA	2034
Naphthalene	620	0	62	0	None	NA	155.0	15.5	NA	1845.91	212.77	NA
Nickel	65.05	0	7.24	0	610	0	16.293	1.8992	61	193.68	24.84	1824
Nitrate(as N)	None	NA	None	NA	10000	0	NA	NA	1000	NA	NA	29909
Nitrobenzene	None	NA	None	NA	17	0	NA	NA	1.700	NA	NA	50.85
Parathion	0.065	0	0.013	0	None	NA	0.016	0.0033	NA	0.19	0.04	NA
PCBs(7 species)	None	NA	None	NA	0.0044	0	NA	NA	0.000	NA	0.00	NA
Pentachlorophenol	0.06	0	0.04	0	0.28	0	0.016	0.0102	0.028	0.19	0.14	0.84
pH	None	NA	None	NA	None	NA	NA	NA	NA	NA	NA	NA
Phenol	None	NA	None	NA	21000	0	NA	NA	2100	NA	NA	62809
Phosphorus(elemental)	None	NA	None	NA	None	NA	NA	NA	96.000	NA	NA	2871
Pyrene	None	NA	None	NA	960	0	NA	NA	NA	NA	NA	NA
Radioactivity	None	NA	None	NA	None	NA	NA	NA	NA	NA	NA	NA
Selenium	20	0	5	0	170	0	5.0	1.3	17.0	59.55	17.16	508
Silver	0.50	0	None	NA	None	0	0.124	NA	0.000	1.48	NA	NA
Silvex	None	NA	None	NA	50	0	NA	NA	5.000	NA	NA	150
Sulfate	None	NA	None	NA	250000	0	NA	NA	25000	NA	NA	747727
Temperature	32	0	32	0	None	NA	8.0	8.0	NA	95	110	NA
Tetrachloroethylene	None	NA	None	NA	320	0	NA	NA	32	NA	NA	957
Toluene	1750	0	175	0	6800	0	437.5	43.75	680	5210.23	600.57	20338
Total dissolved solids	None	NA	None	NA	500000	0	NA	NA	50000	NA	NA	1495455
Toxaphene	0.73	0	0.0002	0	0.0073	0	0.183	0.0001	0.001	2.17	0.00	0.06
Tributyltin	0.46	0	0.026	0	None	NA	0.115	0.0065	NA	1.37	0.09	NA
Trichloroethylene	None	NA	None	NA	27	0	NA	NA	2.700	NA	NA	217.23
Vinyl Chloride	None	NA	None	NA	20	0	NA	NA	2.000	NA	NA	60
Xylenes, total	740	0	74	0	None	NA	185.0	18.5	NA	2203.2	254.0	NA
Zinc	41.60	0	37.67	0	5000	0	10.40	9.42	500.0	123.84	129.29	14854.55

Footnotes:

1. All concentrations expressed as micrograms per liter (ug/L) except Ammonia.
2. Ammonia (as mg/L) selected from separate tables based on pH and temperature.
3. Acute-1 hour avg. concentration not to be exceeded more than 1/3 years.
4. Chronic-4 day avg concentration not to be exceeded more than 1/3 years.
5. Complete mix-mass balances employ 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens
6. All flow values are expressed as Million Gallons per Day.
7. 100% mix assumed based on diffuser.
8. Metals measured as Dissolved, unless specified otherwise.
9. (c)-Indicates carcinogenic parameter.
10. Public Water Supply-protects for fish and water consumption.
11. Other Waters-protects for fish consumption only.
12. Hardness expressed as CaCO3 (mg/L).
13. All limitations are based on EPA's TSD Statistical approach.